

Case 2900***Porites* Link, 1807, *Galaxea* Oken, 1815, *Mussa* Oken, 1815 and *Dendrophyllia* Blainville, 1830 (Anthozoa, Scleractinia): proposed conservation**

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Abstract. The purpose of this application is to conserve the names of four genera of scleractinian corals: *Porites* Link, 1807, *Galaxea* Oken, 1815, *Mussa* Oken, 1815 and *Dendrophyllia* Blainville, 1830. The names *Galaxea* and *Mussa* are in current use for Indo-Pacific and Caribbean genera respectively but are formally unavailable because vol. 3 (Zoologie) of Oken's (1815–1816) work *Lehrbuch der Naturgeschichte*, in which the names were published, has been rejected for nomenclatural purposes (Opinion 417, September 1956). The name *Porites* Link is in universal use for a widely distributed reef-building coral but is threatened by the senior homonym *Porites* Cuvier, 1798. The names *Galaxea*, *Mussa* and *Dendrophyllia* (a predominantly deep-water non-reef-building genus) are also threatened by *Porites* Cuvier as a senior subjective synonym.

Keywords. Nomenclature; taxonomy; Anthozoa; Scleractinia; corals; reefs; *Dendrophyllia*; *Galaxea* (Indo-Pacific); *Mussa* (Caribbean); *Porites*.

1. The status of the new names published in vol. 3 (Zoologie) of Oken's (1815–1816) work *Lehrbuch der Naturgeschichte* was first raised by Allen (1902) in relation to mammals. In 1944 an application for a ruling was made by Dr W.H. Osgood (*Chicago Natural History Museum*) although this was not published until 1954 (BZN 9: 202–203), after Osgood's death. A report (BZN 9: 193–201) prepared by the then Secretary to the Commission, Francis Hemming, included comments, mainly from mammalogists, and concluded that Oken's work was non-binominal and therefore that new names published in it were not available. The work was rejected for nomenclatural purposes and placed on the Official Index (Opinion 417, September 1956). Later Savage (BZN 18: 181; 1961) pointed out that Oken's work was largely binominal but that its layout suggested the contrary.

2. Included in Opinion 417 was an invitation to zoologists to submit applications for the conservation of names published in vol. 3 of Oken's work, the rejection of which would lead to instability or confusion. A number of names have since been conserved from the work (see BZN 51: 339, December 1994, for a list of 10 such names). An application for the conservation of two further names, *Clavella* and *Pennella* (both of Oken, 1815 and both Crustacea, Copepoda), was published in BZN 50: 273–276 (December 1993).

3. *Galaxea* Oken, 1815 (pp. 71, 72–73) was erected for *Madrepora fascicularis* Linnaeus, 1758 (p. 796) and three other species; Vaughan (1918, p. 98) designated *M. fascicularis* as the type species. Despite the ruling in Opinion 417 the name *Galaxea* is in current usage for a widely distributed, Indo-West Pacific genus of about five species

(see Veron, 1986, p. 364). *Galaxea* is the type genus of the subfamily GALAXEINAE Vaughan & Wells, 1943 (p. 184) of the family OCULINIDAE Gray, 1847 (p. 128).

4. *Mussa* Oken, 1815 (pp. 71, 73) was erected for three species including *Madrepora angulosa* Pallas, 1766 (p. 299); Vaughan (1918, p. 122) designated this as the type species. The name *Mussa* is in use for a Caribbean genus of perhaps two species (see Vaughan & Wells, 1943; p. 195); *Mussa* is the type genus of the family MUSSIDAE Ortmann, 1890 (p. 315).

5. *Dendrophyllia* Blainville, 1830 (p. 319) was created for *Madrepora ramea* Linnaeus, 1758 (p. 797) and six other species; Milne Edwards & Haime (1850, p. liii) designated '*Dendrophyllia* *ramea*' as the type species. *Dendrophyllia* is the universally accepted name for a large genus of non-reef-building (ahermatypic) corals that are abundant in deeper water from tropical to polar latitudes (see Vaughan & Wells, 1943, p. 237). About 25–30 living species and many fossil ones are currently recognized as valid (S.D. Cairns, pers. comm.). It is the type genus of the family DENDROPHYLLIDAE Gray, 1847 (p. 128) and of the suborder Dendrophylliida Vaughan & Wells, 1943 (p. 233; spelling changed to Dendrophylliina in Wells, 1956, p. F433). Linnaeus (1758) based his description of *Madrepora ramea* on two sources, Petiver ([1711], pl. 76, fig. 7) and Marsigli (= Marsilli, 1725, pl. 30, fig. 136 and pl. 31, fig. 44 [recte 144]). Zibrowius (1980, p. 169) indicated that *ramea* was composite and noted that the colony figured by Marsilli (1725, pl. 31, fig. 144), most probably from the base of a red coral in the south of the western Mediterranean, was to be considered as the type. This amounts to a lectotype designation (Article 74a of the Code). Zibrowius cited Neviani (1934, pp. 363, 373), who studied Marsilli's material housed in the University of Bologna, Italy; among the scleractinian species present Neviani mentioned *Dendrophyllia ramea*, but it was not clear if the material included the colony figured by Marsilli in 1725.

6. *Porites* Link, 1807 (p. 163) is universally accepted as the valid name of the third largest and the most widely distributed living genus of zooxanthellate, reef-building (hermatypic) corals (see Veron & Pichon, 1982 and Veron, 1986). This genus has dominated many reef habitats during the Caenozoic (Vaughan & Wells, 1943; Foster, 1986) and, especially in the Indo-Pacific, it is often the primary frame-builder of modern reefs. It is the type genus for the family PORITIDAE Gray, 1842 (p. 135) and for the widely accepted superfamily Poritoidae Gray, 1842 (first used by Vaughan & Wells, 1943, p. 146; both this and the spelling Poriticae of Wells (1956, p. F390) do not conform with Recommendation 29A of the Code which would give the spelling PORITOIDEA). Veron (1986, p. 216) mentioned 122 nominal species but, in a continuing revision of the genus, I have already found some 275 specific names that have been referred, explicitly or implicitly, to *Porites* Link. At least 50 of these have some degree of acceptance as valid species in recent literature. These include some of the commonest corals of the Atlantic (for example, *P. porites* Pallas, 1766; *P. astreoides* Lamarck, 1816) and the Indo-Pacific (e.g. *P. compressa* Dana, 1846; *P. lobata* Dana, 1846 and *P. solida* Forsskål, 1775).

7. Link (1807) included two nominal species in his new genus *Porites*, *P. polymorphus* Link, with *Madrepora porites* of Gmelin ([1791], p. 3774) and Esper ([1788], *Madrepora* pl. 21) cited as a synonym, and *Madrepora damicornis* of Gmelin ([1791], p. 3775) and Esper ([1794], *Madrepora* pl. 46), i.e. *Millepora damicornis* Linnaeus, 1758. *Madrepora porites* is the type species of *Porites* by absolute

tautonymy (Article 68e). Gmelin cited *Madrepora porites* Pallas, 1766 (p. 324). In his list of synonyms Gmelin cited *Madrepora porites* Pallas, 1766 (p. 324), which is the first publication of the specific name. However, as discussed by Vaughan (1900, p. 314) and Bernard (1905, p. 3) (see also Foster, 1980, p. 75), Pallas's taxon was composite according to modern taxonomy. Pallas cited a reference to 'Seba thes. III tab. 109, fig. 11' among his sources and Vaughan (1900, p. 315) designated the coral from Curaçao figured by Seba ([1759], pl. 109, fig. 11; 'Corallium, poris stellatis ...', p. 202) as the lectotype of *Madrepora porites* Pallas, 1766. The original specimen used for the illustration in Seba's work has not been found.

8. *Porites* Link, 1807 has a senior homonym, *Porites* Cuvier, 1798 (p. 678). Cuvier's taxon was described and three previously described scleractinian species were included: *Madrepora fascicularis* Linnaeus, 1758, *M. ramea* Linnaeus, 1758 and *M. carduus* Ellis & Solander, 1786 (p. 153, pl. 35), a junior synonym of *Madrepora angulosa* Pallas, 1766 (see Zlatarski & Estalella, 1982, p. 165). No type species was ever designated and each of the included species was later assigned to a different genus (all in different suborders from that containing *Porites* Link) and subsequently designated as the type species of its genus (see paras. 3, 4 and 5 above).

9. Although no species are currently assigned to *Porites* Cuvier, 1798, it remains an available name. Its existence threatens the nomenclatural stability of its junior homonym *Porites* Link, 1807, and of associated names at higher taxonomic levels. The name *Porites* Guettard, 1770 (p. 358), used for some fossil sponges (?), can be ignored since it appeared in a non-binominal work; the name *Porites* 'Lamarck' was used by Lonsdale (1839, p. 686) for some Paleozoic corals (Anthozoa, Tabulata) that were later redescribed as *Heliolites* Dana, 1846 (p. 541).

10. The existence of *Porites* Cuvier, 1798 also threatens the nomenclatural stability of *Galaxea* Oken, 1815, *Mussa* Oken, 1815 and *Dendrophyllia* Blainville, 1830. None of Link (1807), Oken (1815) and Blainville (1830) mentioned *Porites* Cuvier, and all three referred to the previously described species under the older generic name *Madrepora* Linnaeus (1758, p. 793). Apparently they were unaware of Cuvier's (1798) work. I am also not aware of any subsequent author who has ever mentioned *Porites* Cuvier in synonymies of *Galaxea*, *Mussa* or *Dendrophyllia*.

11. I am aware of only one author who has ever referred any species to *Porites* Cuvier since 1798. That was Dana (1846, p. 550) who used the heading '*Porites* — Cuvier' when he described 19 new species and varieties and eight existing species. However, this was clearly an error by Dana for three reasons: (1) Dana included all three of Cuvier's species under other genera without mentioning that Cuvier had referred them to *Porites*; (2) it is clear from the text that Dana was using Link's concept of *Porites* throughout and not that of Cuvier; and (3) the descriptions in Dana (1846) restricted a broader usage of *Porites* by Lamarck (1816, p. 267) back to Link's much narrower concept. Dana (1846) forms the foundation for the modern understanding of *Porites* Link, 1807. Despite this, most nineteenth century authors referred *Porites* to Lamarck (1816) or to later writers; Vaughan (1900, p. 195) seems to be both the earliest direct citation of *Porites* Link and the basis for the almost universal use of *Porites* Link throughout the twentieth century.

12. While no previous author seems to have been aware that *Porites* Cuvier is a senior synonym of the names *Galaxea*, *Mussa* and *Dendrophyllia*, its homonymy with *Porites* Link was indicated briefly by Lang, Smith & Thomas (1940, p. 103) and

Vaughan & Wells (1943, p. 152). Veron & Pichon (1982, p. 141) addressed the issue directly in an addendum that concluded: 'We can find no citation of *Porites* Cuvier, 1798 in any subsequent literature and therefore consider that *Porites* Cuvier, 1798 is a nomen oblitum'. Later comments by Foster (1986, p. 75) and Zlatarski (1990, p. 257) are based on Veron & Pichon (1982) and demonstrate an awareness of the disruptive potential of *Porites* Cuvier. Zlatarski commented: 'A proposal to suppress *Porites* Cuvier, 1798 is necessary in order to validate the priority of Link's authorship'; an application to the Commission has so far not been made.

13. The names *Galaxea* and *Mussa* have remained in use, attributed to Oken (1815), both before and after the publication of Opinion 417 in 1956. They have been used extensively in the literature, both taxonomic and ecological, and I propose that they be conserved. Suppression of *Porites* Cuvier, 1798 will allow the continued stable usage of these names, together with those of *Porites* Link, 1807 and *Dendrophyllia* Blainville, 1830. In addition to the publications already cited in this application the names have appeared in recent works by Zlatarski & Estalella (1982; *Mussa*), Scheer & Pillai (1983; *Galaxea* and *Porites* Link) and Scheer (1991; *Dendrophyllia*). All four names are included in Chevalier (1987). A representative list of a further 12 publications which include one or more of the generic names is held by the Commission Secretariat.

14. A draft of this application was reviewed by the following coral taxonomists: Drs F.M. Bayer (*Smithsonian Institution*), A.F. Budd (*University of Iowa*), S.D. Cairns (*Smithsonian Institution*), C.C. Wallace (*Museum of Tropical Queensland*) and J.E.N. Veron (*Australian Institute of Marine Science*). These specialists all agreed with the intent of the proposals.

15. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary powers:
 - (a) to rule that the following generic names are available despite having been published in a rejected work;
 - (i) *Galaxea* Oken, 1815;
 - (ii) *Mussa* Oken, 1815;
 - (b) to suppress the generic name *Porites* Cuvier, 1798, and all uses of the name *Porites* prior to the publication of *Porites* Link, 1807 for the purposes of both the Principle of Priority and the Principle of Homonymy;
- (2) to place the following names on the Official List of Generic Names in Zoology:
 - (a) *Galaxea* Oken, 1815 (gender: feminine), type species by subsequent designation by Vaughan (1918) *Madrepora fascicularis* Linnaeus, 1758;
 - (b) *Mussa* Oken, 1815 (gender: feminine), type species by subsequent designation by Vaughan (1918) *Madrepora angulosa* Pallas, 1766;
 - (c) *Porites* Link, 1807 (gender: masculine), type species by absolute tautonymy *Madrepora porites* Pallas, 1766;
 - (d) *Dendrophyllia* Blainville, 1830 (gender: feminine), type species by subsequent designation by Milne Edwards & Haime (1850) *Madrepora ramea* Linnaeus, 1758;
- (3) to place the following names on the Official List of Specific Names in Zoology:
 - (a) *fascicularis* Linnaeus, 1758, as published in the binomen *Madrepora fascicularis* (specific name of the type species of *Galaxea* Oken, 1815);

- (b) *angulosa* Pallas, 1766, as published in the binomen *Madrepora angulosa* (specific name of the type species of *Mussa* Oken, 1815);
- (c) *porites* Pallas, 1766, as published in the binomen *Madrepora porites* (specific name of the type species of *Porites* Link, 1807) and as defined by the lectotype designated by Vaughan (1901);
- (d) *ramea* Linnaeus, 1758, as published in the binomen *Madrepora ramea* (specific name of the type species of *Dendrophyllia* Blainville, 1830) and as defined by the lectotype designated by Zibrowius (1980);
- (4) to place the following names on the Official List of Family-Group Names in Zoology:
 - (a) GALAXEINAE Vaughan & Wells, 1943 (type genus *Galaxea* Oken, 1815);
 - (b) MUSSIDAE Ortmann, 1890 (type genus *Mussa* Oken, 1815);
 - (c) PORITIDAE Gray, 1842 (type genus *Porites* Link, 1807);
 - (d) DENDROPHYLLIIDAE Gray, 1847 (type genus *Dendrophyllia* Blainville, 1830);
- (5) to place on the Official Index of Rejected and Invalid Generic Names in Zoology the name *Porites* Cuvier, 1798, as suppressed in (1)(b) above.

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